Optimization of serine protease purification from mango (Mangifera indica Cv. Chokanan) peel in polyethylene glycol/ dextran aqueous two phase system.

Abstract

Mango peel is a good source of protease but remains an industrial waste. This study focuses on the optimization of polyethylene glycol (PEG)/dextran-based aqueous two-phase system (ATPS) to purify serine protease from mango peel. The activity of serine protease in different phase systems was studied and then the possible relationship between the purification variables, namely polyethylene glycol molecular weight (PEG, 4000–12,000 g·mol−1), tie line length (−3.42–35.27%), NaCl (−2.5–11.5%) and pH (4.5–10.5) on the enzymatic properties of purified enzyme was investigated. The most significant effect of PEG was on the efficiency of serine protease purification. Also, there was a significant increase in the partition coefficient with the addition of 4.5% of NaCl to the system. This could be due to the high hydrophobicity of serine protease compared to protein contaminates. The optimum conditions to achieve high partition coefficient (84.2) purification factor (14.37) and yield (97.3%) of serine protease were obtained in the presence of 8000 g·mol−1 of PEG, 17.2% of tie line length and 4.5% of NaCl at pH 7.5. The enzymatic properties of purified serine protease using PEG/dextran ATPS showed that the enzyme could be purified at a high purification factor and yield with easy scale-up and fast processing.

Keyword: Purification; Polyethylene glycol (PEG); Serine protease; Mango peel; Yield.